

Historic, archived document

Do not assume content reflects current
scientific knowledge, policies, or practices.

^{7a}
^{6R} PACIFIC SOUTHWEST
FOREST AND RANGE
EXPERIMENT STATION. ^{7b}

^{5a} BERKELEY, ^{7c} CALIFORNIA

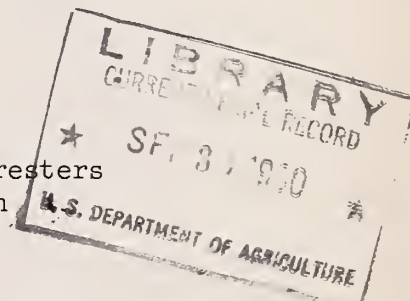
^{7b} RESEARCH
NOTE ^{7c}

^{7c} No. 164 ^{7c}

^{5c} August 1960 ^{7c}

³ CALIFORNIA CONE CROP ¹ 1960 ^{7c}

Gilbert H. Schubert, and Frank J. Baron, Foresters
Division of Forest Management Research



Prospects are favorable for a good crop of forest tree seed in 1960. Field reports indicate that the cone crop on commercial forest trees will be higher this year than during the past three years. Over 50 percent of the reports rated the potential crop as medium or heavier compared to only 14 percent last year. Even with the prospects of a good seed year, the crop will vary considerably within the seed zones. However, areas with good seed crops will be more extensive than during the past few years. Heavy crops for the commercial conifers were indicated by one or more reports from the following zones:

<u>Species</u>	<u>Seed zones</u>
Ponderosa pine	I, II, III, IV, V
Jeffrey pine	I, III, V, VI, VII, VIII, IX
Sugar pine	I, II, III, IV, V, IX, X
California red fir	V, X
White fir	II, III, IV, V, X
Douglas-fir	II, III, IV, X, XIII
Incense-cedar	II, III, IV, V, VII, X, XI

Considerable insect and squirrel damage was observed on Douglas-fir in zones II, X, XI, XII; on white fir in zones I, II, III; on ponderosa pine in zones II and III; and on sugar pine in zones II and III. A large reduction of the cone crop can be expected particularly in zones II (sugar pine) and XI (Douglas-fir).

These are the main conclusions from a study of the cone crop reports sent to the Pacific Southwest Forest and Range Experiment Station by members of the California Division of Forestry, the California Region of the U. S.

¹/ In cooperation with the California Division of Forestry and the California Region of the U. S. Forest Service.

Forest Service, and members of the Experiment Station.

Most of the reports were based on ocular estimates in which the crop was rated as none, very light, light, medium, or heavy. The cone crops rated by the California Division of Forestry was according to the cone crop classification used in Oregon. ^{2/} In this classification the cone crop ratings are:

1. None--no cones on any trees or few cones on occasional trees.
2. Very light--few cones on 25 percent of the trees, or few cones on 25 percent of the trees and many cones on occasional trees.
3. Light--few cones on 75 percent of the trees, or many cones on some trees and few cones on 75 percent of the trees.
4. Medium--some cones on all trees, or many cones on less than 75 percent of the trees.
5. Heavy--many cones on 75 percent of the trees and some cones on all trees, or many cones on all trees.

Since most of the cones in California are borne on dominant and codominant trees, the Oregon system has resulted in some confusion among the field personnel. Therefore a new rating system for cone crop condition was tried this year by the California Region of the U. S. Forest Service and by the Experiment Station. In this system only seed trees (dominant trees over 12 inches d.b.h. with a full crown) were rated. In this classification the cone crop ratings are:

1. None--no cones on any seed trees.
2. Very light--few cones on less than one-fourth of the seed trees.
3. Light--few cones on more than one-fourth of the seed trees.
4. Medium--many cones on one-fourth to one-half of the seed trees.
5. Heavy--many cones on more than half of the seed trees.

Although both of these rating systems are subjective, they provide valuable information for those planning to collect seed this fall.

Several of the cone crops in seed zones IV and V were rated by the cone crop index devised by Fowells and Schubert. ^{3/} This index contains 5 classes of crops based on the average number of cones per tree larger than 19.5 inches in diameter:

Cone crop rating:	Ponderosa pine	Sugar pine or white fir
None	0	0
Light	1-20	1-10
Medium	21-80	11-40
Heavy	81-160	41-80
Very heavy	161-or more	81-or more

^{2/} Engstrom, W. H. Oregon cone crop, 1954. Oregon State Board of Forestry. Res. Note 16, 7 pp.

^{3/} Fowells, H. A. and Schubert, G. H. Seed crops of forest trees in the pine region of California. U. S. Dept. Agr. Tech. Bul. 1150. 48 pp., illus. 1956.

As an aid to seed collectors the crop reports have been segregated according to the forest tree seed collection zones described by Fowells. ^{4/} This grouping (table 1), shows that the most promising localities for collecting seed of major commercial conifers--those with an average rating of at least 3.5--are as follows:

<u>Species</u>	<u>Seed zones</u>
Incense-cedar	II, III, IV, VII
Douglas-fir	II, IV, VII, XIII
California red fir	V
White fir	II, IV, V
Lowland white fir	XI, XIII
Jeffrey pine	I, IV, V, VI, VII, VIII, IX, XI
Knobcone pine	I, III, X
Ponderosa pine	II, III, IV, V, VII, IX
Sugar pine	I, II, III, VII, IX, X, XIII
Redwood	XII, XIII

A map of the collection zones is appended to this note, but since the seed crop varies widely in most zones, it is also advisable to consult field offices of the California Division of Forestry or the U. S. Forest Service to determine best areas to collect cones.

Table 1.--Summary of cone crops by species and seed zone, California, 1960

Species	: Numbers:			Cone crop ^{1/}
	: Seed:	of :	Average ^{2/}	
	: zone:	reports:		Range

CEDAR

Incense-cedar

(<u>Libocedrus decurrens</u>)	I	5	2.6	None to medium
	II	12	4.4	Very light to heavy
	III	8	4.2	Very light to heavy
	IV	16	4.0	Light to heavy
	V	13	2.9	Very light to heavy
	VII	3	4.7	Medium to heavy
	VIII	3	2.3	None to medium
	IX	6	2.3	Very light to light
	X	13	2.3	None to heavy
	XI	5	2.6	Very light to heavy
	All	84	3.3	None to heavy

^{4/} Fowells, H. A. Forest tree seed collection zones in California. U. S. Forest Serv. Calif. Forest and Range Expt. Sta. Forest Res. Note 51, 5 pp., illus. 1946.

Table 1.--Summary of cone crops by species and seed zone, California, 1960,
continued

Species	: Numbers:			
	: Seed:	of :	Cone crop ^{1/}	
	: zone:	reports:	Average ^{2/} :	Range
<u>DOUGLAS-FIR</u>				
Bigcone Douglas-fir				
(<u>Pseudotsuga macrocarpa</u>)	IX	6	2.8	Very light to heavy
	X	3	1.7	None to very light
	All	9	2.4	None to medium
Douglas-fir	I	3	2.7	None to medium
(<u>P. Menziesii</u>)	II	18	4.1	Very light to heavy
	III	12	3.0	None to heavy
	IV	5	4.0	Light to heavy
	V	4	3.2	Light to medium
	VII	1	4.0	Medium
	VIII	1	1.0	None
	X	20	2.6	None to heavy
	XI	24	2.7	None to medium
	XII	3	2.0	Very light
	XIII	5	4.0	Light to heavy
	All	96	3.1	None to heavy
<u>FIR</u>				
Bristlecone fir	Monterey	1	3.0	Light
(<u>Abies bracteata</u>)	county			
California red fir	I	6	3.2	None to medium
(<u>A. magnifica</u>)	II	3	2.7	Very light to medium
	III	14	3.0	Very light to medium
	IV	1	2.0	Very light
	V	11	3.5	Very light to heavy
	VI	2	2.5	None to medium
	VII	6	2.8	Very light to medium
	VIII	11	2.4	None to medium
	X	10	3.3	None to heavy
	All	64	3.1	None to heavy
Lowland white fir	XI	1	4.0	Medium
(<u>A. Grandis</u>)	XIII	3	4.3	Medium to heavy
	All	4	4.2	Medium to heavy
White fir	I	10	1.9	None to light
(<u>A. concolor</u>)	II	18	3.8	Very light to heavy
	III	17	2.5	None to heavy
	IV	17	4.4	Very light to heavy
	V	15	3.7	Very light to heavy
	VI	3	3.3	Very light to medium
	VII	6	1.2	None to very light
	VIII	12	2.4	None to medium
	IX	6	2.0	Very light

Table 1.--Summary of cone crops by species and seed zone, California, 1960,
continued

Species	:Numbers:	:Seed: of :	Cone crop ^{1/}
	:zone:reports:	Average ^{2/} :	Range
White fir, cont'd	X 14	2.5	None to heavy
	XI 4	2.0	Very light
	All 122	3.0	None to heavy
<u>HEMLOCK</u>			
Mountain hemlock	I 1	4.0	Medium
(<u>Tsuga mertensiana</u>)	VII 2	5.0	Heavy
	VIII 4	4.5	Medium to heavy
	All 7	4.6	Medium to heavy
<u>JUNIPER</u>			
Western juniper	III 1	1.0	None
(<u>Juniperus occidentalis</u>)	VII 3	3.0	None to medium
	VIII 6	3.3	None to heavy
	All 10	3.0	None to heavy
<u>PINE</u>			
Bishop pine	XII 2	2.0	Very light
(<u>Pinus muricata</u>)	XIII 1	4.0	Medium
	All 3	2.7	Very light to medium
Coulter pine	IX 14	3.3	Very light to medium
(<u>P. coulteri</u>)	All 15	3.2	Very light to medium
Jeffrey pine	I 13	3.8	None to heavy
(<u>P. jeffreyi</u>)	II 7	2.7	None to medium
	III 16	3.1	None to heavy
	IV 12	3.7	Light to medium
	V 20	4.0	Very light to heavy
	VI 5	4.4	Medium to heavy
	VII 9	4.0	Light to heavy
	VIII 7	3.7	Very light to heavy
	IX 13	3.8	Very light to heavy
	X 4	2.5	None to light
	XI 1	4.0	Medium
	All 107	3.6	None to heavy
Knobcone pine	I 1	4.0	Medium
(<u>P. attenuata</u>)	III 4	4.0	Light to heavy
	X 4	5.0	Heavy
	All 9	4.4	Light to heavy
Lodgepole pine	I 2	3.5	Light to medium
(<u>P. contorta</u>)	III 4	3.0	Very light to medium
	IV 2	2.0	Very light
	V 4	3.8	Very light to heavy

Table 1.--Summary of cone crops by species and seed zones, California, 1960,
continued

Species	: Numbers:		Cone crop ^{1/}	Range
	: Seed:	: zone: reports:		
			Average 2/:	
Lodgepole pine, cont'd.	VII	3	4.0	Light to heavy
	VIII	8	3.5	Very light to heavy
	IX	1	5.0	Heavy
	XII	2	2.0	Very light
	XIII	1	4.0	Medium
	All	27	3.4	Very light to heavy
Monterey pine (<u>P. radiata</u>)	XIII	2	4.0	Medium
Ponderosa pine (<u>P. ponderosa</u>)	I	16	3.4	None to heavy
	II	30	3.9	None to heavy
	III	32	3.8	None to heavy
	IV	28	4.3	Light to heavy
	V	21	3.9	Very light to heavy
	VII	3	4.0	Medium
	IX	8	3.6	Light to medium
	X	24	2.2	None to medium
	XI	17	1.8	None to medium
	XIII	2	2.5	Very light to light
	All	181	3.4	None to heavy
Single leaf pine (<u>P. monophylla</u>)	VI	2	1.0	None
	VIII	2	2.0	None to light
	All	4	1.5	None to light
Sugar pine (<u>P. lambertiana</u>)	I	7	3.7	Very light to heavy
	II	20	3.6	Very light to heavy
	III	28	4.1	Very light to heavy
	IV	26	3.3	Very light to heavy
	V	14	3.1	Very light to heavy
	VII	2	3.5	Light to medium
	VIII	4	2.2	None to medium
	IX	8	4.2	Light to heavy
	X	23	3.9	Very light to heavy
	XI	12	2.9	Very light to medium
	XIII	1	4.0	Medium
	All	145	3.6	None to heavy
Western white pine (<u>P. monticola</u>)	I	2	4.0	Light to heavy
	III	5	4.4	Medium to heavy
	V	8	4.2	Light to heavy
	VI	2	4.0	Medium
	VII	3	4.7	Medium to heavy
	VIII	7	4.4	Medium to heavy
	IX	1	5.0	Heavy
	All	28	4.4	Light to heavy

Table 1.--Summary of cone crops by species and seed zones, California, 1960,
continued

Species	: :Numbers:			Cone crop ^{1/}
	:Seed:	of :	Average ^{2/} :	
	:zone:	reports:		Range
Whitebark pine	I	1	2.0	Very light
(<u>P. albicaulis</u>)	VIII	3	5.0	Heavy
	All	4	4.2	Very light to heavy
<u>SEQUOIA</u>				
Giant sequoia	IV	1	5.0	Heavy
(<u>Sequoia gigantea</u>)	V	5	3.2	Very light to medium
	All	6	3.5	Very light to heavy
Redwood	XI	1	3.0	Light
(<u>S. Sempervirens</u>)	XII	6	3.5	Very light to medium
	XIII	5	4.0	Medium
	All	12	3.7	Very light to medium
ALL SPECIES		940	3.4	

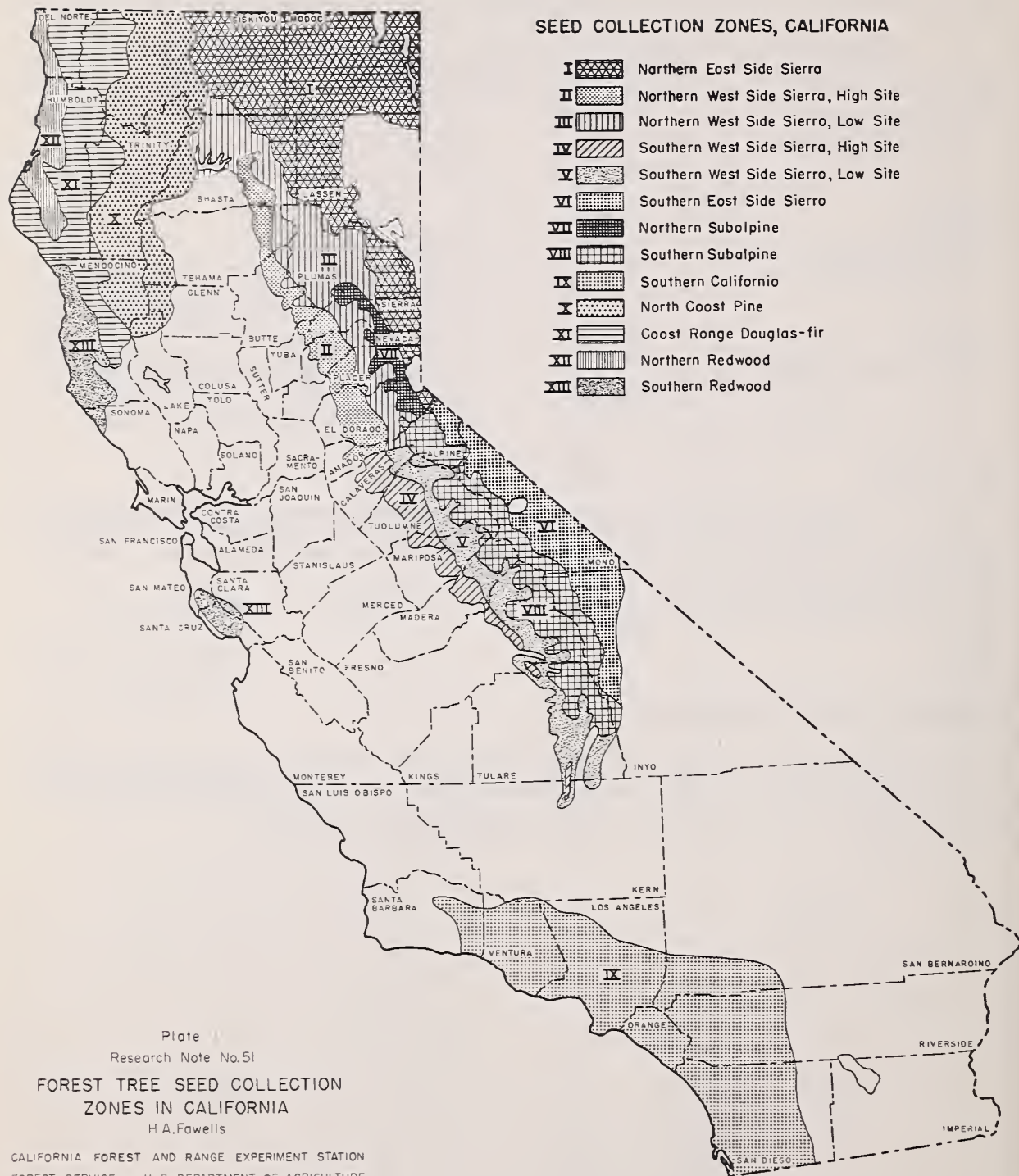
^{1/} Reported by technicians of the California Division of Forestry, the California Region of the U. S. Forest Service, and the Pacific Southwest Forest and Range Experiment Station.

^{2/} Based on the numerical scale: 1 = none, 2 = very light, 3 = light, 4 = medium, and 5 = heavy.

Evaluation of 1959 Forecast:

In general the 1959 cone crop turned out about as predicted for most species and zones. The main exceptions were for Douglas-fir in zones XI and XII (losses due to insects were lighter than expected).

SEED COLLECTION ZONES, CALIFORNIA



Plate

Research Note No.51

FOREST TREE SEED COLLECTION ZONES IN CALIFORNIA

H.A. Fawcett

CALIFORNIA FOREST AND RANGE EXPERIMENT STATION
FOREST SERVICE - U. S. DEPARTMENT OF AGRICULTURE

